5-2 Inequalities and Triangles

Definition of Inequality-- a > b iff there is a positive number c, such that a = b + c

ex

$7 = 4 + 3$
$7 > 4$
$7 > 3$

Properties

Comparison $a > b$ $a = b$ $a < b$

Transitive If $a \gtrless b$ and $b \gtrless c$ then $a \gtrless c$

Addition/Subtraction

If $a > b$ then $a + c > b + c$ ($-c$)

Multiplication/Division

If $c > 0$ $a > b$, then $ac > bc$ $\frac{a}{c} > \frac{b}{c}$

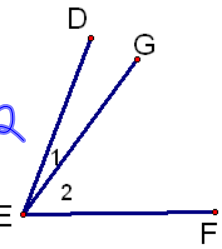
If $c < 0$ (negative) $a > b$, then $ac < bc$ $\frac{a}{c} < \frac{b}{c}$
$a < b$ $ac > bc$ $\frac{a}{c} > \frac{b}{c}$

Ex:

$LN = LM + MN$ (S.A.P.)

$LN > LM$
$LN > MN$ (Def of Ineq.)

Ex:

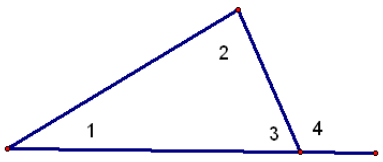


$m\angle DEF = m\angle 1 + m\angle 2$ (A.A.P.)

$m\angle DEF > m\angle 1$
$m\angle DEF > m\angle 2$

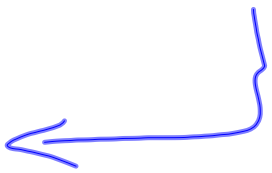
def of ineq.

Ex:



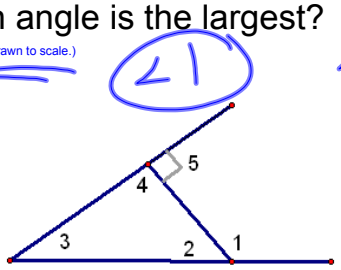
$m\angle 4 = m\angle 1 + m\angle 2$ (Ext $\angle$ thm)
$m\angle 4 > m\angle 1$
$m\angle 4 > m\angle 2$

<u>Thm. 5.8 Exterior Angle Inequality Theorem</u>--The ext. angle of a triangle is greater than either of its corresponding remote interior angles



Which angle is the largest?

(Figure is not drawn to scale.)

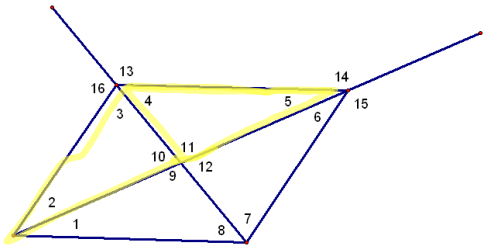


$m\angle 1 > m\angle 3$ $m\angle 1 > m\angle 5$

$m\angle 1 > m\angle 4$ $m\angle 5 > m\angle 3$

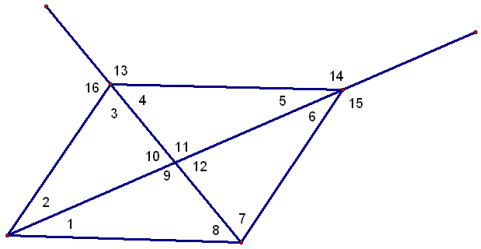
$m\angle 5 > m\angle 2$

What angles measure less than angle 14? (Figure is not drawn to scale.)



$m\angle 4$, $m\angle 11$, $m\angle 10$, $m\angle 3$, $m\angle 9$, $m\angle 6$, $m\angle 7$

What angles measure greater than angle 5? (Figure is not drawn to scale.)



$m\angle 10$, $m\angle 12$, $m\angle 13$

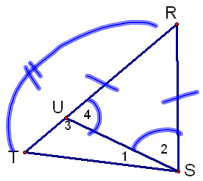
$m\angle 16$, $m\angle 15$

Given: $\triangle RST$

$RU = RS$

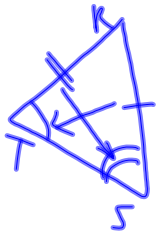
$RT > RS$

Prove: $m\angle RST > m\angle T$

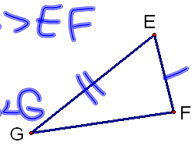


S.	R.
1.	1. Given
2. $m\angle 2 = m\angle 4$	2. Isos. Thm
3. $m\angle RST = m\angle 2 + m\angle 1$	3. A.A.P.
4. $m\angle RST > m\angle 2$	4. Def of Ineq
5. $m\angle RST > m\angle 4$	5. Subst
6. $m\angle 4 > m\angle T$	6. Ext $\angle$ Ineq Thm
7. $m\angle RST > m\angle T$	7. Transitive

Theorem 5.9--If one side of a triangle is longer than another side, then the angle opposite the longer side has a greater measure than the angle opposite the shorter side.

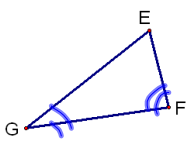


If $EG > EF$ then $m\angle F > m\angle G$



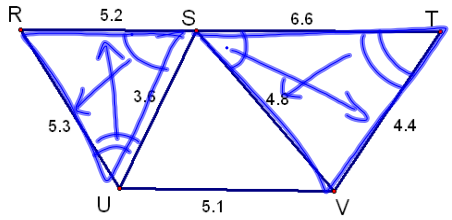
Theorem 5.10--If one angle of a triangle is larger than another angle, then the side opposite the larger angle has a greater measure than the side opposite the shorter angle.

If $m\angle F > m\angle G$ then $EG > EF$



1. Which is greater, m∠RSU or m∠SUR?

2. Which is greater, m∠TSV or m∠STV?



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